

Do NOT write on this exam.

Remember your test-taking strategies.

Good luck!

ALGEBRA 2 FINAL EXAM

Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

Identify the following as exponential growth, exponential decay or neither.

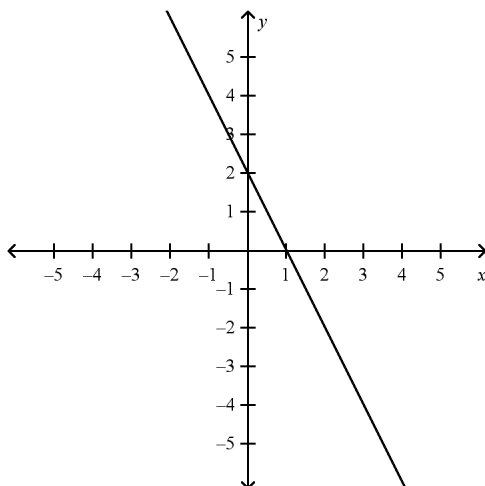
1.

x	y
-1	2
0	6
1	18
2	54

- a. Exponential Decay b. Neither c. Exponential Growth

2. $y = \frac{1}{6}(7)^x$

- a. Neither b. Exponential Growth c. Exponential Decay



3.

- a. Exponential Decay b. Exponential Growth c. Neither

Identify the type of function represented by the equation.

4. $y = x^2 + 5x + 6$

- a. quadratic function c. trigonometric function
b. linear function d. exponential function

5. $y = 2(5)^x$

- a. linear function c. exponential function
b. quadratic function d. trigonometric function

Write the exponential function that fits the given information.

6. You have \$600 in a bank account and you spend 30% of the money every month.

a. $y = 600(-30)^x$ b. $y = 600(1.3)^x$ c. $y = 600(0.7)^x$ d. $y = 600(0.3)^x$

7. A pet store has 12 gerbils, which triple in population every four months.

a. $y = 12(4)^x$ b. $y = 12(3)^4$ c. $y = 12(3)^x$ d. $y = 3(4)^x$

8.

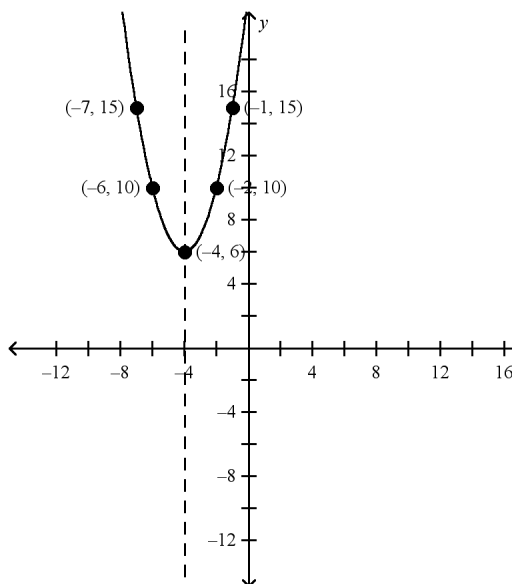
x	y
-1	1.5
0	6
1	24

a. $y = 6(24)^x$ b. $y = 4(6)^x$ c. $y = 6(4)^x$ d. $y = 6(2)^x$

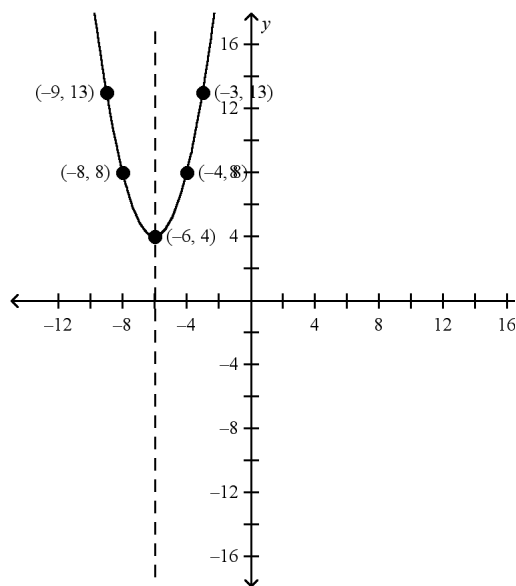
Graph the quadratic equation.

9. $y = (x - 4)^2 - 6$

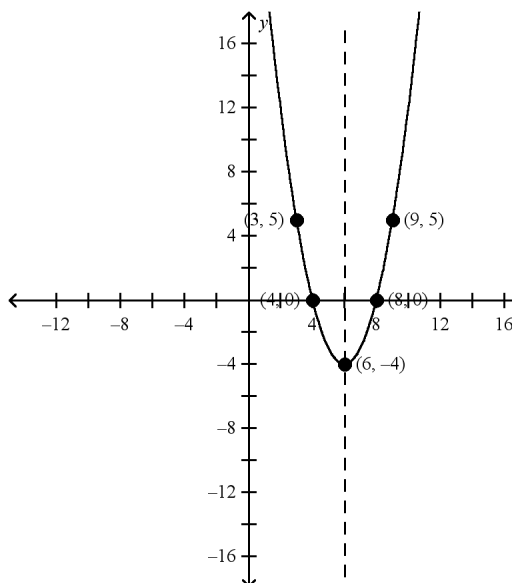
a.



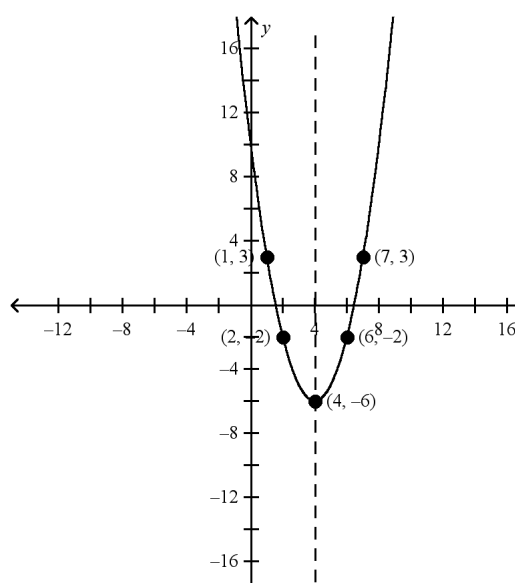
c.



b.



d.



Choose the transformation of the parent function that is NOT true according to the equation.

10. $y = \frac{2}{3}(x - 2)^2 - 4$

a. Shifted left 2 units

b. Shifted down 4 units

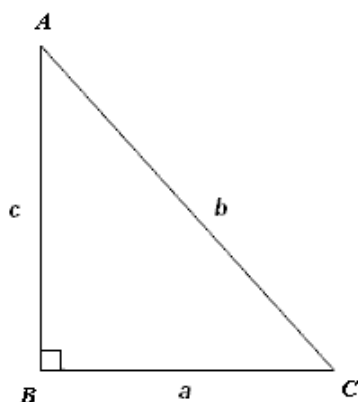
c. Shifted right 2 units

d. Wider parabola

11. $y = -5x^2 + 8$
 a. Shifted right 8 b. Skinnier c. Opens down d. Shifted up 8 units
12. A 15-m long ladder rests against a wall at an angle of 60° with the ground. How far is the foot of the ladder from the wall? (Consider drawing a picture to help you).
 a. 12.9 m c. 7.5 m
 b. 30 m d. 17.3 m
13. The Smiths bought an apartment for \$75,000. Assuming that the value of the apartment will appreciate (increase) 4% a year, how much will the apartment be worth in 3 years?
 a. \$84,365 c. \$75,916
 b. \$66,347 d. \$85,858

Find x.

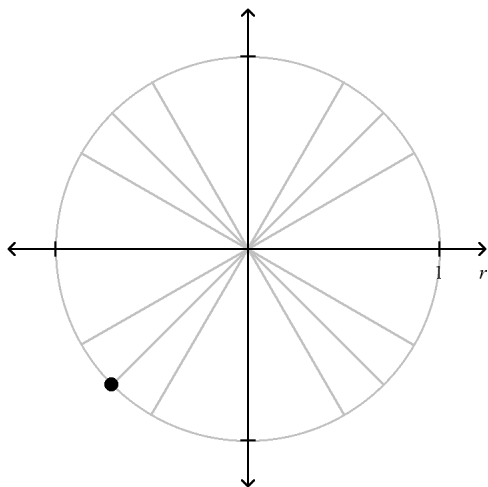
14. $5^{2x+3} = 5^{-x+1}$
 a. $x = -\frac{3}{2}$ b. $x = -\frac{2}{3}$ c. $x = -2$ d. $x = 2$
15. $3^{2x-1} = 27$
 a. $x = 1$ b. $x = 1.5$ c. $x = 14$ d. $x = 2$
16. Solve $\triangle ABC$ by using the measurements $B = 90^\circ$, $A = 15^\circ$, and $a = 10$. Round measures of sides to the nearest tenth and measures of angles to the nearest degree.



- a. $\angle C = 75^\circ$, $c \approx 38.0$, $b \approx 37.0$ c. $\angle C = 75^\circ$, $c \approx 37.0$, $b \approx 10$
 b. $\angle C = 75^\circ$, $c \approx 3$, $b \approx 3$ d. $\angle C = 75^\circ$, $c \approx 37.0$, $b \approx 38.0$

17. In a tourist bus near the base of Eiffel Tower at Paris, a passenger estimates the angle of elevation to the top of the tower to be 60° . If the height of Eiffel Tower is about 984 feet, what is the distance from the bus to the base of the tower? (Draw a picture to help).
- a. 568.13 feet c. 492 feet
b. 586.13 feet d. 1704.28 feet

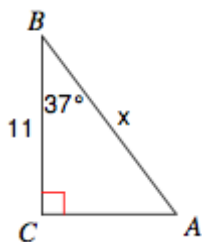
Label the point on the unit circle in radians and degrees.



- 18.
- a. $210^\circ, \frac{5\pi}{4}$ b. $210^\circ, \frac{7\pi}{6}$ c. $225^\circ, \frac{5\pi}{4}$ d. $225^\circ, \frac{7\pi}{6}$

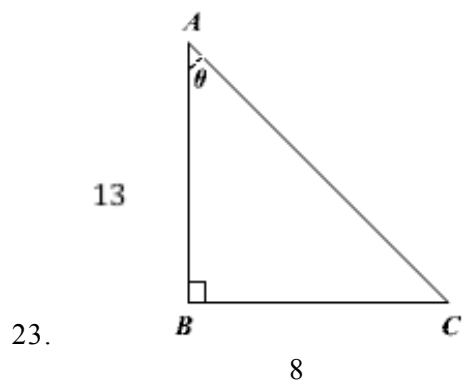
Simplify the following expressions.

19. $(2x+7)(x+4)$
- a. $x^2 + 11x + 28$ b. $2x^2 + 15x + 28$ c. $x^2 + 15x + 28$ d. $2x^2 + 11x + 28$
20. $(3+2i)(2-5i)$
- a. $6-i$ b. $5-3i$ c. $-4-11i$ d. $16-11i$
21. $\sqrt{-121}$
- a. 11 b. $11i$ c. -11 d. $-11i$



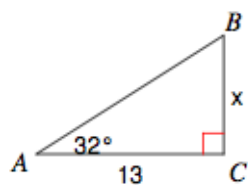
- 22.
- a. 18.3 b. 13.77 c. 6.62 d. 8.8

Find the missing side length using the Pythagorean Theorem.



- a. 10.25 b. 15.26 c. 233 d. 105

24. Find x



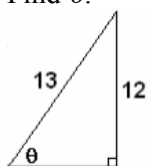
- a. 8.12 b. 20.8 c. 6.9 d. 11.02

Rewrite the radian measure in degrees.

25. $\frac{7\pi}{6}$

- a. 15° c. $210\pi^\circ$
b. 210° d. 2100°

26. Find θ .



- a. 67.3° b. 2.7° c. 22.62° d. 42.71°

27. Find the equation of the quadratic function that goes through the points $(-1, -2)$ and $(0, -5)$.

a. $y = -\frac{1}{3}(x-1)^2 - 2$

c. $y = 3(x+1)^2 - 2$

b. $y = -3(x+1)^2 - 2$

d. $y = \frac{1}{3}(x+1)^2 - 2$

Find the coordinates of the vertex of the quadratic function.

28. $f(x) = 2(x-5)^2 + 3$

a. $(-5, 3)$

c. $(2, 3)$

b. $(5, 3)$

d. $(5, -3)$

Solve the equation by factoring.

29. $x^2 + 4x - 32 = 0$

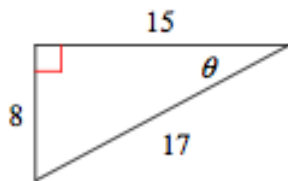
a. $x = 4, 8$

c. $x = -8, 4$

b. $x = -4, -8$

d. $x = -4, 8$

30. Find the values of the six trigonometric functions for angle θ .



a. $\sin \theta = \frac{17}{8}$ $\cos \theta = \frac{17}{15}$ $\tan \theta = \frac{15}{8}$
 $\csc \theta = \frac{8}{17}$ $\sec \theta = \frac{15}{17}$ $\cot \theta = \frac{8}{15}$

b. $\sin \theta = \frac{17}{15}$ $\cos \theta = \frac{17}{8}$ $\tan \theta = \frac{15}{8}$
 $\csc \theta = \frac{8}{17}$ $\sec \theta = \frac{8}{15}$ $\cot \theta = \frac{15}{17}$

c. $\sin \theta = \frac{8}{17}$ $\cos \theta = \frac{15}{17}$ $\tan \theta = \frac{8}{15}$
 $\csc \theta = \frac{17}{8}$ $\sec \theta = \frac{17}{15}$ $\cot \theta = \frac{15}{8}$

d. $\sin \theta = \frac{15}{17}$ $\cos \theta = \frac{8}{17}$ $\tan \theta = \frac{15}{8}$
 $\csc \theta = \frac{17}{15}$ $\sec \theta = \frac{17}{8}$ $\cot \theta = \frac{8}{15}$

Find the exact solution of the following quadratic equation by using the Quadratic Formula.

31. $-x^2 + 7x + 7 = 0$

a. $\left\{ \frac{7 - \sqrt{77}}{-2}, \frac{7 + \sqrt{77}}{-2} \right\}$

b. $\left\{ \frac{-7 - \sqrt{77}}{-2}, \frac{-7 + \sqrt{77}}{-2} \right\}$

c. $\left\{ \frac{-7 - \sqrt{52}}{-2}, \frac{-7 + \sqrt{52}}{-2} \right\}$

d. $\left\{ \frac{-7 - \sqrt{21}}{-2}, \frac{-7 + \sqrt{21}}{-2} \right\}$

32. If one angle of a right triangle measures 23° , what is the measure of the other angle?

a. 67°

b. 70°

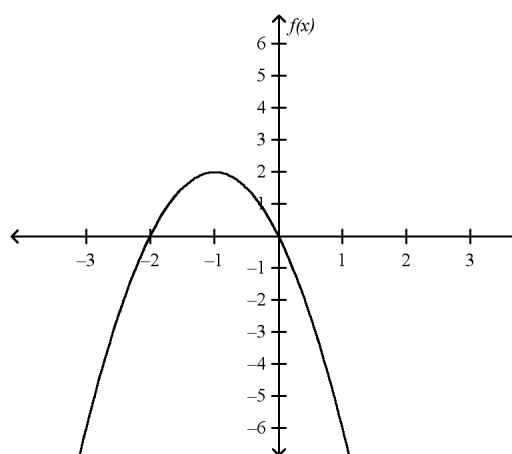
c. 63°

d. 157°

Solve the equation by graphing.

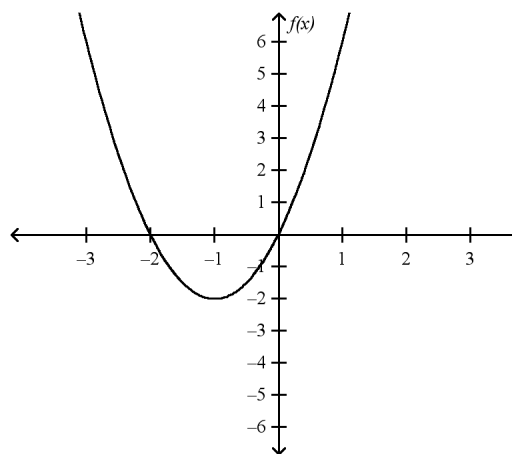
33. $-2x^2 - 4x = 0$

a.



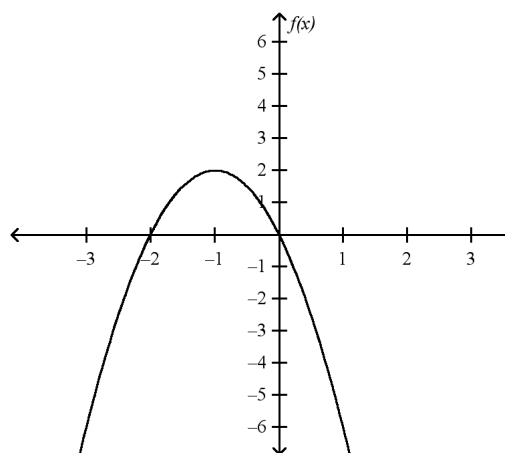
$x = -0, 2$

b.



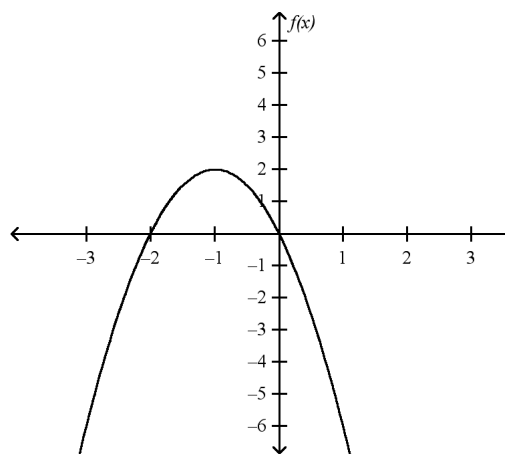
$x = -0, 2$

c.



$x = -1, 2$

d.



$x = -2, 0$

Rewrite the degree measure in radians.

34. 15°

a. 687.9π

c. $\frac{12}{\pi}$

b. $\frac{\pi}{12}$

d. 2160π

Determine whether the given function has a maximum or a minimum value. Then, find the maximum or minimum value of the function.

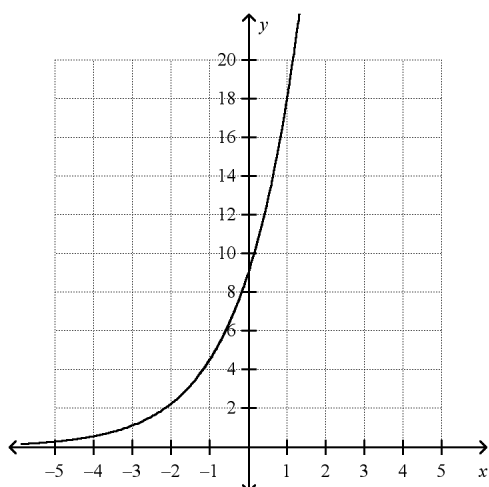
35. $f(x) = 2x^2 - 8x + 1$

- The function has a maximum value. The maximum value of the function is 25.
- The function has a minimum value. The minimum value of the function is -7 .
- The function has a maximum value. The maximum value of the function is -7 .
- The function has a minimum value. The minimum value of the function is 25.

Sketch the graph of the given function. Then state the function's domain and range.

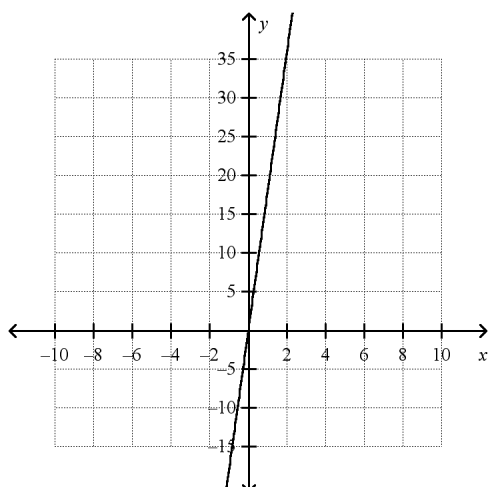
36. $y = 9(2)^x$

a.



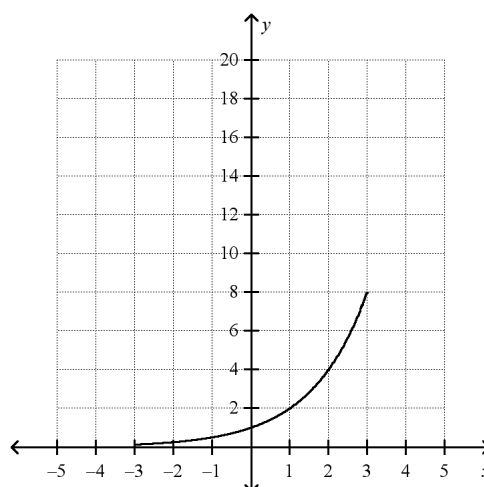
The domain is all real numbers and the range is all positive numbers.

b.



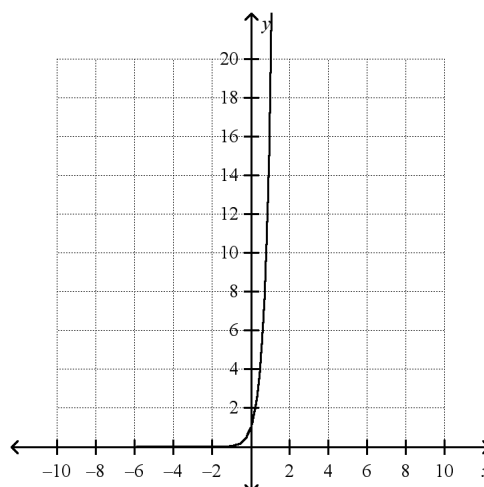
The domain is all real numbers and the range is all real numbers.

c.



The domain is all real numbers and the range is all positive numbers.

d.



The domain is all real numbers and the range is all positive numbers.

Factor the following.

37. $y = 2x^2 - 7x + 5$

- a. $(x+5)(x+1)$ b. $(2x-5)(x-1)$ c. $(x-5)(x-1)$ d. $(2x+5)(x+1)$

Find the solutions of the quadratic function using the method of your choice.

38. $y = x^2 + 7x + 12$

- a. $x = -2, -6$ b. $x = -4, -3$ c. $x = 4, 3$ d. $x = 2, 6$

Matching

Match each vocabulary word with its definition.

- | | |
|---------------------------|---------------------|
| a. Vertex | e. Axis of symmetry |
| b. Growth or decay factor | f. Zero or Root |
| c. Transformation | g. Parabola |
| d. Hypotenuse | |

39. The shape of the graph of a quadratic function
40. The line that cuts a parabola in half
41. The maximum or minimum value of a quadratic function
42. One name for b in $f(x) = a \cdot b^x$
43. The general name for changing a parent function (horizontal or vertical stretch/shrink, horizontal or vertical translation, etc)
44. The longest leg of a right triangle
45. Another name for the x-intercept of a function

ALGEBRA 2 FINAL EXAM**Answer Section****MULTIPLE CHOICE**

- | | | |
|------------|--------|---|
| 1. ANS: C | PTS: 1 | |
| 2. ANS: B | PTS: 1 | |
| 3. ANS: C | PTS: 1 | |
| 4. ANS: A | PTS: 1 | |
| 5. ANS: C | PTS: 1 | |
| 6. ANS: C | PTS: 1 | |
| 7. ANS: C | PTS: 1 | |
| 8. ANS: C | PTS: 1 | |
| 9. ANS: D | PTS: 1 | STA: MI I.2.2 MI II.3.4 MI II.3.5 MI III.1.1 MI III.1.4 |
| 10. ANS: A | PTS: 1 | |
| 11. ANS: A | PTS: 1 | |
| 12. ANS: C | PTS: 1 | STA: MI I.2.5 MI II.1.2 MI II.3.1 MI II.3.3 MI IV.3.2 |
| 13. ANS: A | PTS: 1 | STA: MI I.2.5 MI I.2.6 MI IV.2.5 MI IV.3.2 |
| 14. ANS: B | PTS: 1 | |
| 15. ANS: D | PTS: 1 | |
| 16. ANS: D | PTS: 1 | STA: MI I.2.6 MI II.1.1 MI II.1.7 MI II.3.1 MI II.3.3 |
| 17. ANS: A | PTS: 1 | NAT: NA 2 NA 6 NA 9 NA 10 NA 3 |
| | | STA: MI I.2.5 MI II.1.2 MI II.3.1 MI II.3.3 MI IV.3.2 |
| 18. ANS: C | PTS: 1 | |
| 19. ANS: B | PTS: 1 | |
| 20. ANS: D | PTS: 1 | |
| 21. ANS: B | PTS: 1 | |
| 22. ANS: B | PTS: 1 | |
| 23. ANS: B | PTS: 1 | |
| 24. ANS: A | PTS: 1 | |
| 25. ANS: B | PTS: 1 | STA: MI I.2.5 MI I.2.6 MI II.1.1 MI II.1.7 MI II.3.6 |
| 26. ANS: A | PTS: 1 | |
| 27. ANS: B | PTS: 1 | |
| 28. ANS: B | PTS: 1 | STA: MI I.2.2 MI II.3.4 MI II.3.5 MI III.1.1 MI III.1.4 |
| 29. ANS: C | PTS: 1 | STA: MI I.2.2 |
| 30. ANS: C | PTS: 1 | STA: MI I.2.5 MI I.2.6 MI II.1.1 MI II.1.2 MI II.1.7 |
| 31. ANS: B | PTS: 1 | |
| 32. ANS: A | PTS: 1 | |
| 33. ANS: D | PTS: 1 | |
| 34. ANS: B | PTS: 1 | STA: MI I.2.5 MI I.2.6 MI II.1.1 MI II.3.1 MI II.3.6 |
| 35. ANS: B | PTS: 1 | STA: MI I.2.2 MI II.2.2 MI II.2.5 MI II.3.4 MI II.3.5 |
| 36. ANS: A | PTS: 1 | STA: MI I.2.2 MI I.2.5 MI I.2.6 MI IV.2.5 |
| 37. ANS: B | PTS: 1 | |
| 38. ANS: B | PTS: 1 | |

MATCHING

- | | |
|------------|--------|
| 39. ANS: G | PTS: 1 |
| 40. ANS: E | PTS: 1 |
| 41. ANS: A | PTS: 1 |
| 42. ANS: B | PTS: 1 |
| 43. ANS: C | PTS: 1 |
| 44. ANS: D | PTS: 1 |
| 45. ANS: F | PTS: 1 |